Marine Management Organisation

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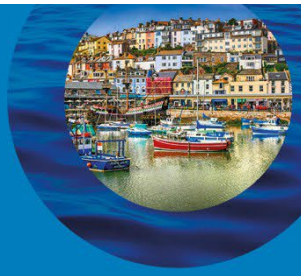

Crawfish (*Palinurus spp*) minimum conservation reference size increase - Response to southwest crawfish industry workshop

November 2023

...ambitious for our seas and coasts

Version control history

Version	Author	Date and comment
1	Louise Price	Draft completed 12/10/23
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Summary

The fishing industry has shared concerns with government regarding the recent increase in crawfish (*Palinurus spp*) landings coupled with an observed increase in the size of the fishery. This included the Marine Management Organisation (MMO), the Department of Environment, Food and Rural Affairs (Defra), Seafish and Southwest Inshore Fisheries and Conservation Authorities (IFCAs).

Over the last five years landings have increased rapidly, the fishing season has expanded into the winter months, and the fleet profile has changed, with an increase in the number of larger vessels in the fishery. These changes are apparent from the available data and from observations from fishers and local IFCA officers.

There are limited national management measures in the fishery apart from a minimum conservation reference size (MCRS) of 95 mm that is likely below the age that female crawfish reproduce in the North Atlantic, and limiting the number of crawfish (*Palinurus spp*) a fisher can catch daily without holding a shellfish licence entitlement. The recent changes in the fishery, alongside its previous history of cycles of boom and bust, suggest that urgent intervention is required.

Crawfish are included in the crab and lobster fisheries management plans and longer-term management measures from 2024 will be enacted through this mechanism. However, it is clear that short-term measures are immediately needed to ensure that the fishery is sustainable in the short and long term.

A co-design workshop was arranged for 3 October 2023 with local fishers and

government, to discuss the current issues with the southwest crawfish fishery, and proposed options for management in the short-term. MMO proposed two initial solutions in the workshop. These were:

- An increase in the minimum conservation reference size (MCRS) from 95 mm to 110 mm in English waters of ICES area 7 (map of area available in Annex).
- A seasonal closure of the fishery during the off-peak fishing period. Suggested timeframes included a closure from November 2023 or January 2024 to June 2024.

An increase MCRS was proposed as it will likely increase the reproductive output of the population, by increasing the likelihood that crawfish can spawn at least once before they reach a harvestable size. Evidence also suggests that larger crawfish have a higher reproductive potential. As such these changes are expected to deliver increased stock biomass over time.

An MCRS is easily assured by the MMO and the IFCAs at the point of inspection. Previous MCRS are already applied in UK shellfish fisheries and accepted by industry as an effective means of improving stock sustainability.

There was unanimous agreement in the workshop to implement an MCRS increase to 110 mm and MMO agreed to look to implement this through a licence condition within ICES area 7 as soon as possible, dependent on the outcome of the crab and lobster FMP consultation. Further information on discussions and outcome of the workshop is available here.

Following the workshop, MMO has worked with Defra, Seafish and the IFCAs to design and implement a licence condition to increase MCRS from 95 mm to 110 mm in English waters of ICES area 7. This will be in force from 1 January 2024.

MMO is also working with other government departments and the fishing industry to determine if other management measures are required to regulate the crawfish fishery. This includes a consultation on a seasonal closure and further work on effort restrictions.

Rationale behind MCRS increase

Background of the crawfish fishery

The current regulations of crawfish MCRS in waters in and around ICES area 7 is available in Table 1. Ireland, France, Wales, and inshore areas in the SW of England have already increased MCRS limits to 110 mm.[1,2] A national increase in minimum conservation reference size (MCRS) from 95 mm to 110 mm in English waters has also been proposed for crawfish as part of the crab and lobster fisheries management plan (FMP).

[1] Laurans , M. , Habasque , S. & Caroff , N. 2011. Spiny lobster fishery in Brittany (France) – how the lack of management led to the quasi - collapse of the stock. *9th International Conference and Workshop on Lobster Biology and Management,* Bergen 19 – 24 June 2011.
[2] A. Lawler, pers. comm.

Table 1: Current regulations of crawfish MCRS from regulators in ICES area 7. The fish shall be measured, as the length of the carapace, parallel to the midline, from the tip of the rostrum to the midpoint of the distal dorsal edge of the carapace.

Regulator	**MCRS (mm)**	**Regulation**
Cornwall IFCA	110	Crawfish byelaw
Devon and & Severn IFCA	110	D&S IFCA byelaw booklet
Kent and Essex IFCA	95	Not specified, refer to Technical Conservation measures 2019/1241 - Section 4
Isles of Scilly IFCA	110	Crawfish minimum landing size byelaw
MMO	95	Technical Conservation measures 2019/1241 - Section 4
Southern IFCA	110	MCRS byelaw
Sussex IFCA	95	MCRS booklet
Welsh Government	110	https://www.gov.wales/legislation-crustacean-fisheries

Landings for crawfish have increased from 19 tonnes in 2012 to 55 tonnes in 2022 (Figure 1, see annex). The crawfish fishery is high value, in 2012, £436,000 of crawfish were landed, this has risen in line with the increased landing quantities to £1,358,000 in 2022 (Figure 2).

The number of vessels that are targeting the species (landing over 50kg/year) has risen from 10 -15 vessels in the early 2000s, to exceeding 50 vessels in 2021.

The fishery is dominated by the under 10 m fleet, averaging 58% of all landings from 2012 to 2022. In recent years there has also been a near doubling in the number of ≥ 12 m vessels exploiting the fishery, from three to five vessels between 2010-2020 to eight to nine vessels in 2021-2022. Any increase in the number of ≥12 m vessels equate to a far greater increase in the fleet's fishing capacity, with ≥ 12 m netters capable of carrying 400-1000 nets, whereas >12m netters are limited to <100 nets.

The fishery is naturally seasonal with the largest landings in the late summer months (Figure 3).

The gear used to catch crawfish has changed; in 2012 there were almost equal landings across all fleet sectors from pots and nets, in 2022, over 60% of all landings from all fleet sectors were from nets.

Environmental considerations

High levels of fishing pressure can deplete the spawning stock and impair recruitment, leading to reduced fishery productivity and resilience. If recruitment drops below threshold levels, the risk of a stock collapse increases. Current increases in fishing effort are concerning given the absence of a valid stock assessment, which creates vast uncertainties around stock status and how much fishing pressure crawfish stocks can sustain. This creates challenges for long term sustainable management, particularly in the context of a historically 'boom and bust' and data-limited fishery.

Crawfish are also a species of conservation importance in Marine Conservation Zones (MCZs) and there is a risk that a decline in crawfish populations in the southwest region (i.e. caused by increased fishing pressure) may impact populations within MCZs– preventing MCZ conservation objectives from being met.[3] As this species is relatively mobile, recruitment into populations within MCZs is likely linked to the wider population[4].

Crawfish can grow to be amongst the largest crustacea (up to 600 mm total length) and are typically slow growing – however growth increments are unclear (2mm/yr Cornwall; 12mm/yr Ireland)[5,6]. Size at maturity is thought to vary regionally, however maximum reproductive yield (in terms of eggs per unit weight) occurs between 100-110 mm carapace length (CL) for North Atlantic females.[7]

Survey data suggests there has been an increase in the length of both sexes over time, however the majority of females caught in 2023 were still under 100 mm (Figure 4). Data from an observer programme shows there has been an increase in recording of crawfish lengths data since 2017, and a shift from a significant discard/undersize component in earlier years, to more retained individuals in 2022 (Figure 5).

The purpose of the increase in MCRS is to reduce fishing mortality on spawning stock so as to increase opportunities for crawfish to spawn before they are removed from the fishery.

At present, there is a risk that crawfish are removed from the fishery before having an opportunity to spawn[8]. To ensure stock viability, it is recommended that at least 50% of females should spawn once before removal. Whilst crawfish size at maturity is likely to vary regionally and with depth, maximum reproductive yield (in terms of eggs-per-unit-weight) occurs in females from 100 to 110 mm CL, with studies suggesting that the size at

[3] Crawfish population size within MCZs needs to recover in order for conservation objectives to be met, which partly depends on continued successful recruitment.
[4] NE and JNCC advice to Defra, 2012.
[5] Mercer, J. P. (1973). Studies on the spiny lobsters (Crustacea: Decapoda: Palinuridae) of the west coast of Ireland, with particular reference to *Palinurus elephas* Fabricius, 1787: 1-331. (Ph.D. Thesis, University College Galway).
[6] Morcom, S., Stamp, T., and Hooper, T. 2022. Interim report on European Spiny Lobster (*Palinurus elephas*) fishery for Isles of Scilly District.
[7] Goñi, R., Quetglas, A. & Reñones, O. (2003) Size at maturity, fecundity and reproductive potential of a protected population of the spiny lobster *Palinurus elephas* (Fabricius, 1787) from the western Mediterranean. Marine Biology, 143, 583-592.
[8] Krouse, J. S. 1987. Maine lobster minimum size limits: past, present, and future. Lobster Research Program. Maine Department of Marine Resources.

maturity for Atlantic crawfish is around 103 mm [9,10,11,12] .This means that the current national 95 mm MCRS is unlikely to afford sufficient protection to the spawning stock. This is corroborated with scientific advice from the Centre for Environment, Fisheries and Aquaculture Science (Cefas), with preliminary analysis (using spawners per recruit methods) suggesting that the MCRS of 95 mm poses a risk for the females as fishing pressure increases.

Cefas scientific advice has suggested that based on the available information on growth and maturity, a spawner per recruit analysis has indicated that 110 mm may offer reasonable protection at high fishing pressure. Data from an observer programme provides an indication of what the impact of an increase in MCRS to 110 mm may be (Figure 6). Over 2017-2023, there was around 60% of crawfish under 95 mm in the trips sampled, 20% in the 95-110 mm category and 20% over 110 mm. In the retained component, roughly 55% was over 110mm and 45% in the 95-110 mm category. This suggests an increase in MCRS could result in 45% of crawfish currently retained in the 95 – 110 mm category being returned to the sea.

Protecting larger size ranges of crawfish is likely to have benefits in terms of population reproductive potential. Studies investigating size at maturity and fecundity have reported that animals within the 105 to 110 mm CL size range yield 19% of total egg production, therefore protection of these individuals would likely have significant benefits for recruitment.

As crawfish can usually be released alive from pot fisheries (discard survival rates are high), a larger MCRS is likely to have conservation benefits in terms of supporting a larger spawning stock biomass and enhanced reproductive capacity. However, it should be noted that crawfish discard survival rates from English net fisheries remains uncertain, and further evidence is required to determine the extent to which an MCRS increase would deliver conservation benefits from the net fishery. If discard survival is high, an increased MCRS should lead to larger and more mature individuals and protect stocks from over-fishing – therefore supporting stock recovery and, in time, improved catches.

Cefas scientific advice also suggested that while it would be beneficial to harmonise the MCRS at 110 mm, it may not offer enough protection to the stock if catch levels are not also controlled. Any other measures that may be used to cap the total level of catches should be considered. This may include a closure or effort limitations such as a limit on total landings.

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[9] Goñi, R. & Latrouite, D. (2005) Review of the biology, ecology and fisheries of Palinurus spp. species of European waters: *Palinurus elephas* (Fabricius 1787) and *Palinurus mauritanicus* (Gruvel, 1911). Cahiers de Biologie Marine, 46, 127-142.

[10] Leslie, B., & Shelmerdine, R. L. 2012. Management measures for self-propagated future recovery of crawfish, *Palinurus elephas* in Welsh waters. CCW Contract Science Report No: 989.

[11] Goñi, R., Quetglas, A. & Reñones, O. (2003) Size at maturity, fecundity and reproductive potential of a protected population of the spiny lobster *Palinurus elephas* (Fabricius, 1787) from the western Mediterranean. Marine Biology, 143, 583-592.

[12] Tully , O. 2011. Crayfish minimum landing size. Marine Institute, Ireland. Irish Sea Fisheries Board. Unpublished Report. 9 pp.

Social and economic considerations

There are potentially short-term economic losses due to crawfish between 95 mm and 109 mm being excluded from future harvest. This is unlikely to impact the principal inshore fisheries within IFC Districts (such as Cornwall and Isles of Scilly) in the southwest where the 110 mm MCRS is already in place. Furthermore, the magnitude of this impact will depend on the proportion of landings between 95 and 100 mm CL and the growth rate (time to grow from 95 to 110 mm CL) – whereby the initial decline in landings and ensuing economic loss will be greater in areas where a higher proportion of catches fall within the aforementioned forgone size range. Additional evidence is required to understand the full impact of the change.

In the industry workshop there was unanimous support for a MCRS increase as it will allow the stock to grow in the longer term. This was despite the potential short-term fishers estimating a potential decrease in overall landings by 10 – 20%.

In the workshop fishers also stated that there was no market for smaller crawfish, with merchants interested in larger sizes, so will support the increase. Larger crawfish typically attract a higher price and this should be accounted for when evaluating the likely scale of this impact.

Fishers suggested in the workshop that the increase in MCRS can be implemented quickly as it will not require a change in gear. Fishers can choose to experiment with gear after to reduce catches of juveniles if required.

There are also expected long-term economic benefits as once the 'forgone harvest' (e.g. crawfish between 95 mm and 109 mm CL) moult and recruit into the fishery the next year, they will have increased in both size and weight – i.e. increased long-term annual yield[13]. In analogous crustacean fisheries such as the English pot fishery for European lobster (*H. gammarus*), the most recent MCRS increase in 2000 (85-87 mm) produced only a short term drop in catches, whilst long term benefits (such as increased reproductive potential) were realised and catch per unit effort (CPUE) recovered to pre-'MCRS increase' levels within a year. Similar benefits were observed in the Brittany (Finisterre) crawfish fishery.

The current difference in MCRS between inshore and offshore regions in the southwest increases the risk that fishers might intentionally or unintentionally misreport catches to land product that does not meet the relevant MCRS. Carriage of smaller crawfish (under 110 mm CL) claimed to have been caught outside 6nm are not in breach of local IFCA byelaws. This creates a potential monitoring and enforcement loophole and has implications for traceability as well as our ability to assess the sustainability of regional fisheries. A harmonised MCRS would close this loophole, reduce area misreporting, and result in a simplified management landscape. This will mean that legislation is both easier for fishers to adhere to, and easier to enforce.

[13] By 2.4% to 6.5% relative to current catches, with an economic net-benefit (recovery of the economic cost of transitioning to a 90mm MLS for European lobsters (*Homarus gammarus*) reached in 2.8 to 6.4 years.

Legislation and policy considerations

When considering this decision MMO took into account the various obligations and considerations in legislation and policy. These included MMO:

- Being mindful of the principles of public law which includes requiring measures to be necessary and expedient for the regulation of sea fishing, as well as being proportionate and enforceable.
- Reviewing the southwest crawfish fishery from an environmental, social and economic perspective, in line with its obligations under the Fisheries Act 2020.
- Delivering policies in line with the fisheries objectives as an obligation under the Joint Fisheries Statement. Of particular relevance to the southwest crawfish fishery are the sustainable and precautionary objectives. This decision aligns with the sustainable objective to ensure the short term social and economic risks have been balanced with long term health of the marine environment that provides resilience to coastal communities whilst protecting the stock for future fisheries. The decision aligns with the precautionary objective because action is required due to the significant increases in fishing pressure in recent years despite the inherent gaps in our knowledge regarding stock status.
- Having regard to national and international agreements as outlined in the Joint Fisheries Statement. These include the Marine Strategy Regulations 2010, which require fishery bodies in the UK to take action to achieve or maintain Good Environmental Status (GES) in all UK waters and the UK Marine Strategy which is a key pillar of marine policy in the UK.
- Aligning with the draft crab and lobster FMP. This includes a proposed management measure of a national increase in MCRS from 95 mm to 110 mm in English waters. MMO has also had due regard to responses on the consultation of the draft FMP when making this decision.
- Aligning with and being compliant with the following marine plan policies in the south and southwest marine plans: S-AQ-2, S-BIO-2, S-FISH-1, SW-FISH-1, SW-FISH-3, SW-MPA-1, SW-MPA-2, SW-BIO-1, SW-BIO-2. The remaining policies in the south and southwest marine plans are not applicable to this decision.
- Comply with our public sector equality duty under the Equality Act 2010. MMO has considered if people with any protected characteristics are likely to have different needs in relation to the decision made within this document or if the decision is likely to present unequal opportunity, result in discrimination or fail to foster good relations between people with different diversity characteristics. MMO has very limited data on protected characteristics of people who fish in ICES area 7 for crawfish, however MMO does not consider the decisions made will discriminate or disadvantage people with protected characteristics. MMO would welcome any comments or information on this matter if required.
- This measure will support the sustainable exploitation of crawfish populations which is thought to be an important element to help support MCZs to reach their conservation objectives where crawfish is a designated feature. Previous advice from statutory nature conservation bodies (SNCBs) stated that "*due to the mobile nature of the species and the lack of scientific understanding surrounding its migration and biology, it is thought that to recover populations of the species to favourable condition in South*

West England waters, a mechanism that covers areas larger than individual MCZ sites would be required, in addition to any measure introduced through MCZs".

Next steps

The following increase in MCRS to 110mm in ICES area 7 for the crawfish fishery will be applied through a licence condition, and will come into force on 1 January 2024.

Proposed wording for this is as follows:

"In English waters of ICES sea area VII, the minimum conservation reference size for crawfish (*Palinurus* spp.) shall be 110mm and shall be measured, as the length of the carapace, parallel to the midline, from the tip of the rostrum to the midpoint of the distal dorsal edge of the carapace."

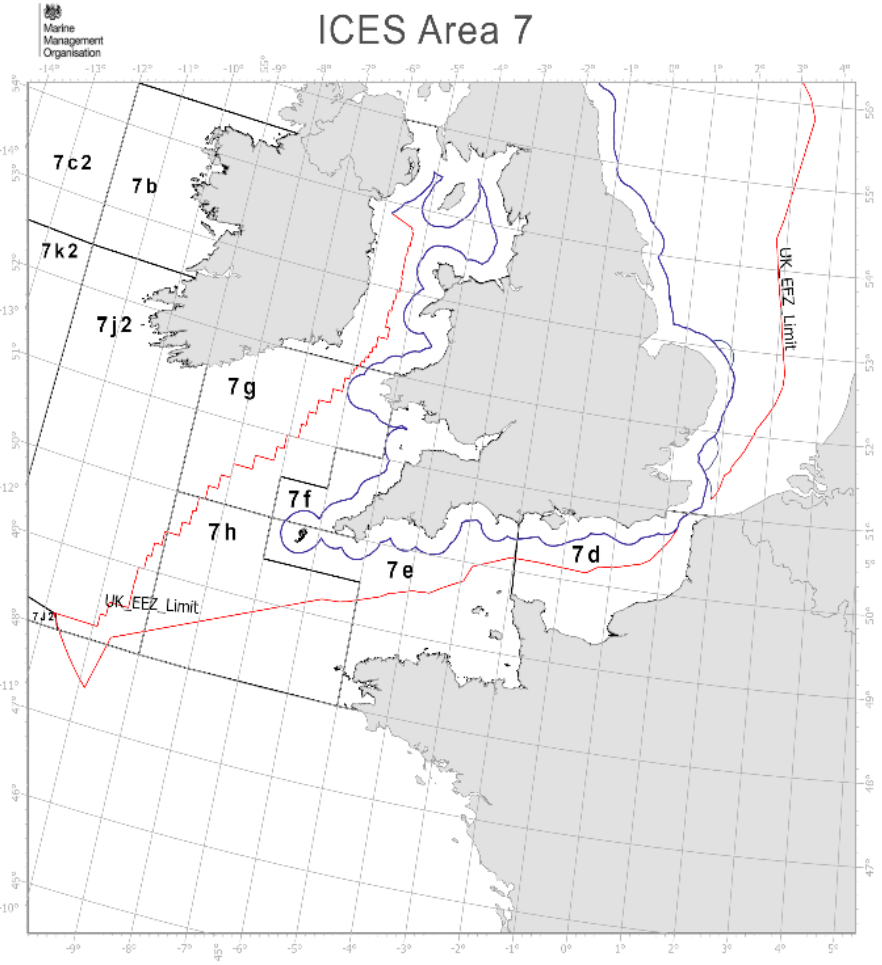
Any fisher who is the nominated contact on the domestic fishing vessel license system and has a shellfish flag will be informed via an email notification when the variation is enacted.

All attendees to the southwest crawfish industry workshop will be informed of the decision by email.

MMO is also working with other government departments and the fishing industry to determine if other management measures are required to regulate the crawfish fishery. This includes a consultation on a seasonal closure and further work on effort restrictions.

Annex

Map displaying ICES area 7:



Landings data:

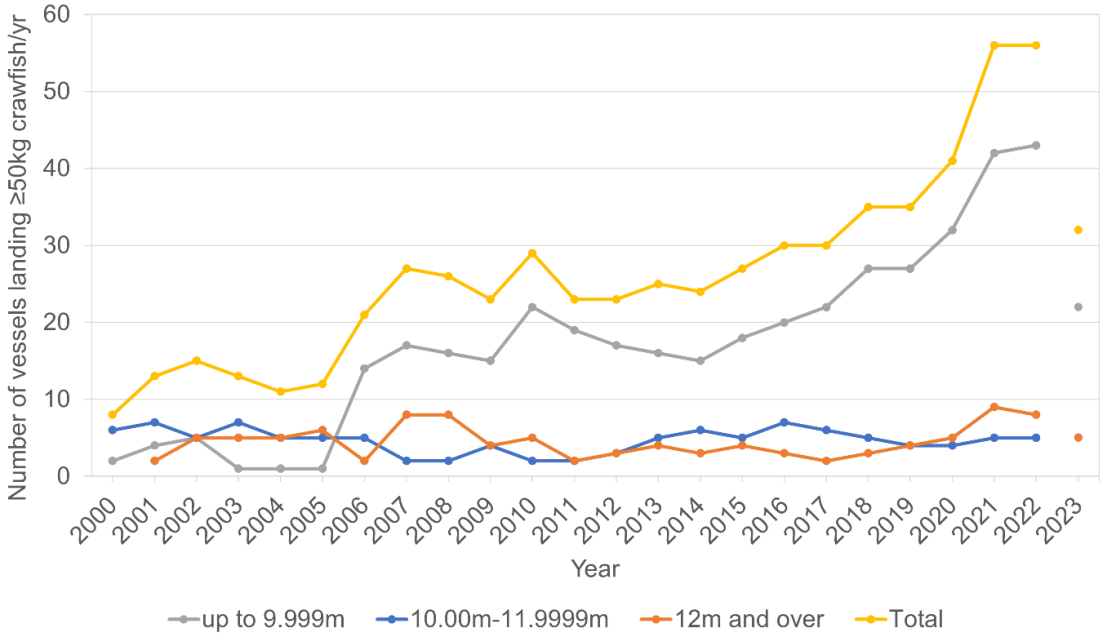


Figure 1: Number of vessels landing ≥50kg (live weight, tonnes) of crawfish into English ports between 2000 and 2023. Please note that data for 2023 is provisional at this stage, and available only for the months of January-June.

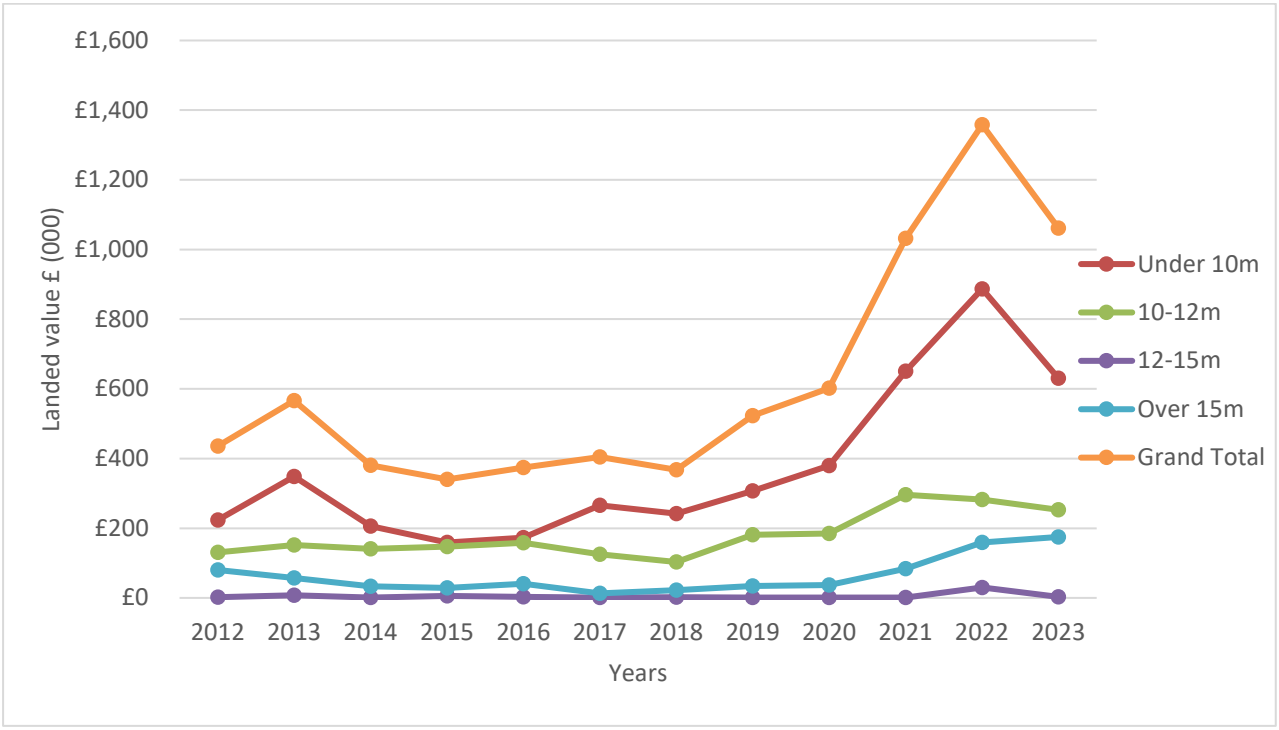


Figure 2: The landed value of the Crawfish fishery from 2012-2023

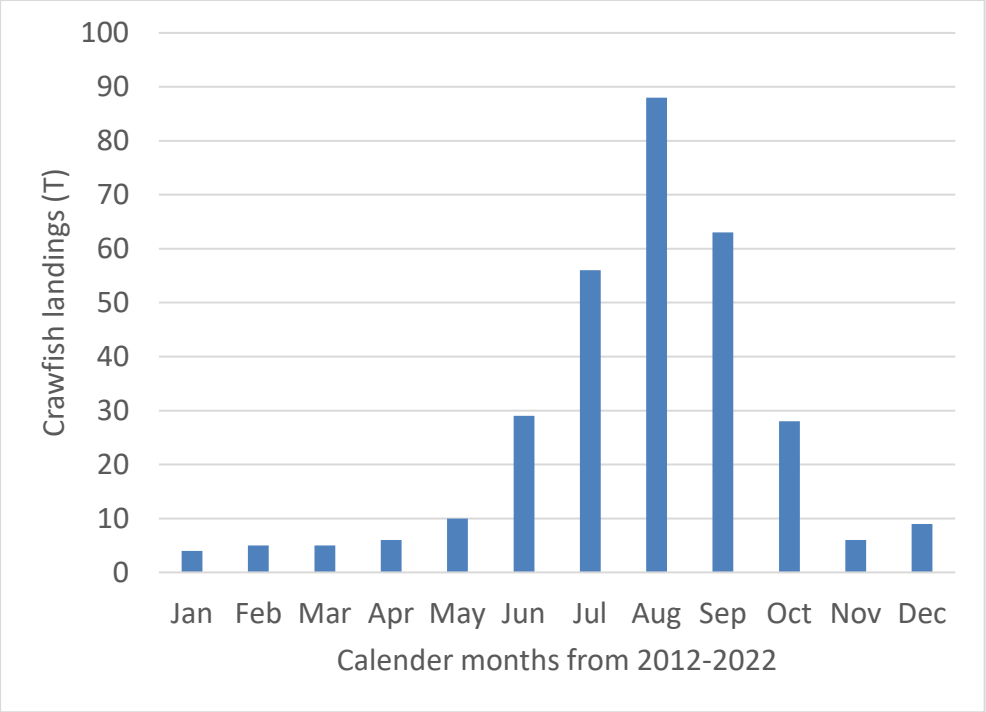


Figure 3: Crawfish landing data, monthly summed totals from 2012 -2022 in UK waters.

EU vessels working in UK waters have had nominal crawfish landings over the last 3 years.

In 2021 a total of 10 kg was landed by EU vessel working in UK waters in August and December 2021. In 2022 a total of 73 kg was landed by EU vessels working in UK waters in December. In 2023 there have been no landings declared by EU vessel working in UK waters.

Scientific data:

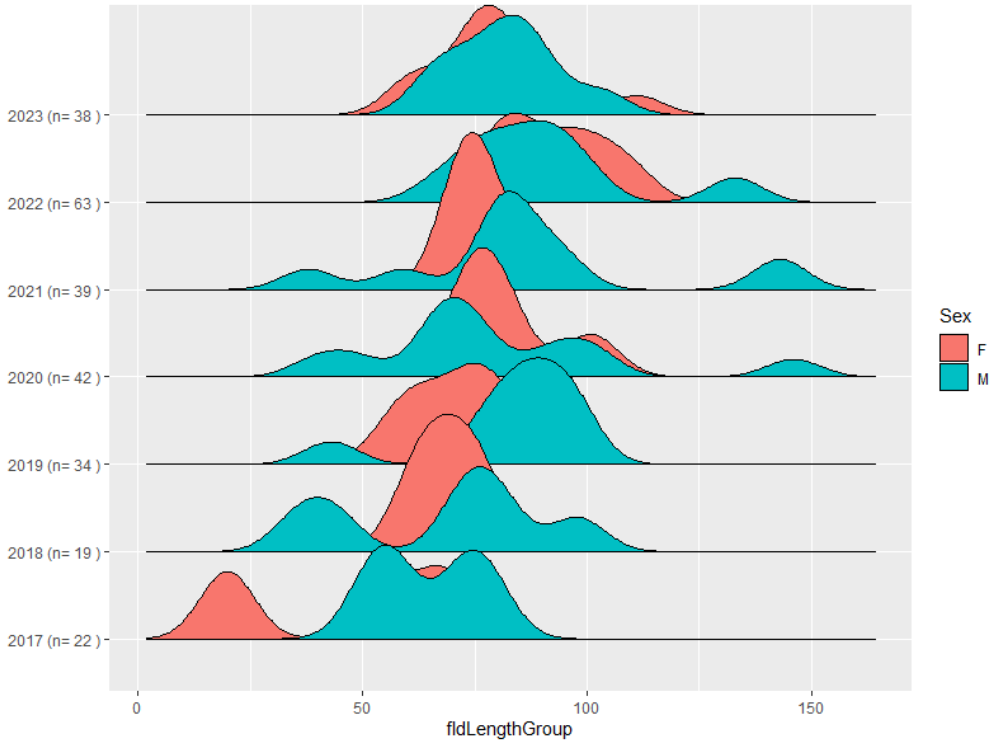


Figure 4: Length distribution of survey catches by sex. In brackets the number of animals caught and measured. The southwest beam trawl survey occurs in March-April, with time series starting in 2007, and there were no data of significance pre-2017.

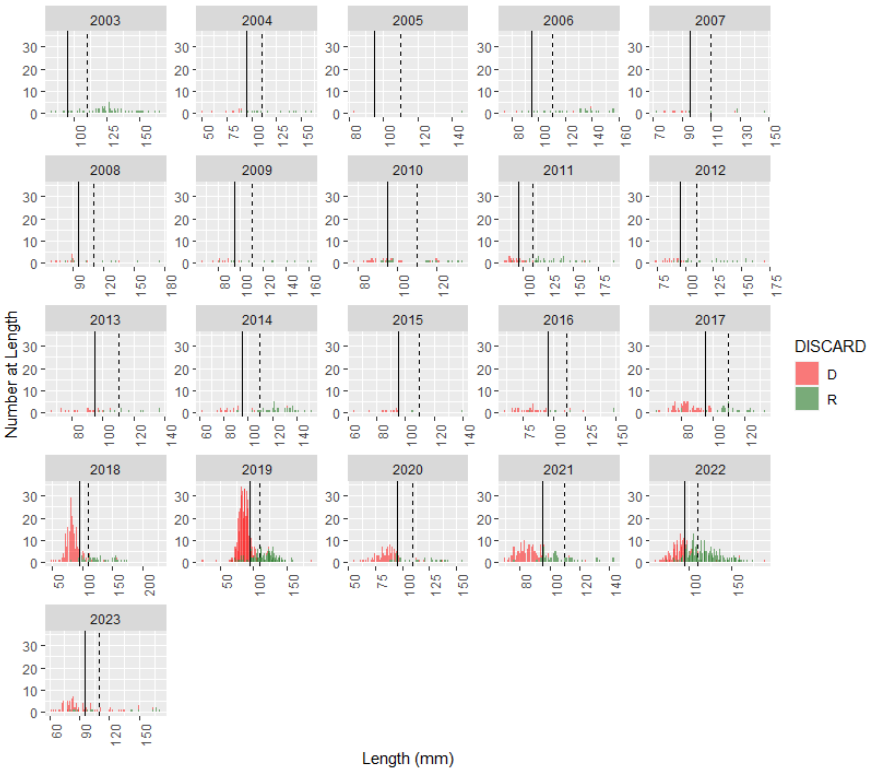


Figure 5: Length distribution of sampled trips where crawfish were caught (note this is not raised to the full population, it sums up to the number of crawfish caught on sampled trips). Solid line is 95mm, dash line 110mm.

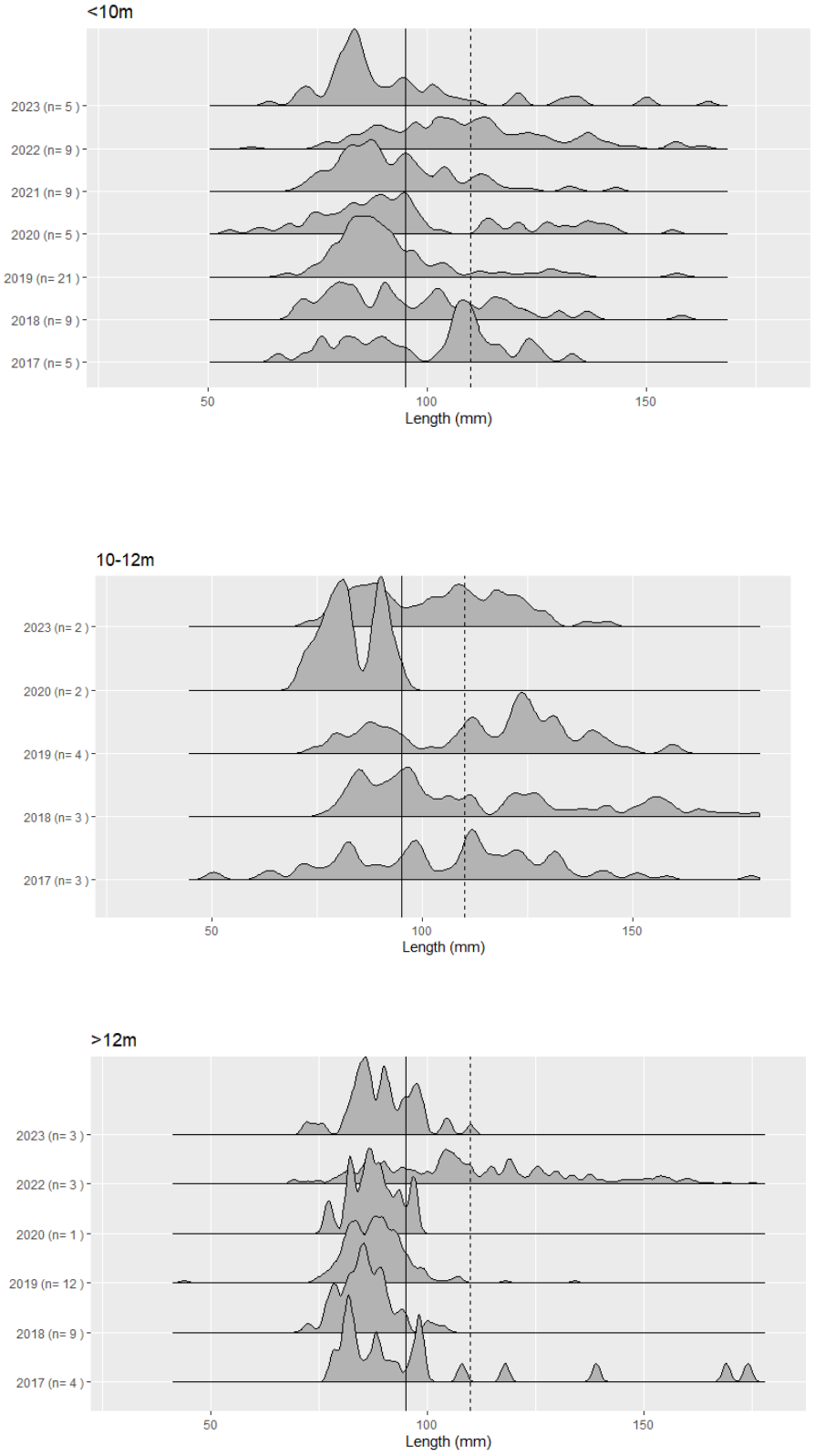


Figure 6: Length distribution of sampled trips that caught crawfish (note this are density plots, does not allow comparison of how much was caught from one year to the next). Solid line is 95mm, dash line 110mm. Sample size in brackets (number of trips).